been relegated to the category of merely commercial designations, the rating bearing no more precise relation to the real thing than does the term 'best' as applied to flour or other commodities," a description fully realised when one sees a nominal 1000 candle-power arc blinking with a feeble 200 candle-power duty.

The book is so good, and deals with such a little studied subject, that it is to be hoped that the author will add to the value of the work in its next edition by either giving full references to the original papers or adding a short bibliography. It is undoubtedly a book which should take its place as a work of reference in the library of everyone interested in artificial illumination.

PHYSIOLOGICAL HISTOLOGY.

Methods and Theory of Physiological Histology. By Gustav Mann, M.D., C.M., D.Sc. Pp. xv + 488. (Oxford: Clarendon Press, 1902.) Price 15*s.* net.

A FIRST attempt at scientific research in a new field should always command our respect, and this book, professing to expound the methods of physiological histology with their underlying reasons, is no exception to the rule. The author has with incredible labour collected all the current information on physical chemistry colloids, histology and the chemistry of dye-stuffs, and has endeavoured to combine these into one harmonious and coherent whole, and to deduce from them reasonable answers to all the questions that have arisen on the subjects of the fixation and staining of animal tissues. That the explanations of the observed facts in histology have so far been fragmentary, incomplete and unsatisfactory, no one will deny, and if this work has hardly as yet brought us to a final and definite conclusion, the fault must be laid to the door of our collective ignorance of the matters involved rather than to the writer of the present volume.

A considerable space has been allotted to subjects which bear more or less directly on the theories afterwards propounded, and, as a rule, these are admirable summaries of the work already done. The chapter on colloids is especially worthy of praise. The chapters containing the accounts of the author's own carefully performed experiments are also very interesting, though whether all his readers will or will not agree with his conclusions is quite another matter. However, there is no question as to the success of the fixing fluids which have been proposed as a result of these researches, and the practical directions accompanying them will be of value to everyone who is not familiar with the processes employed. This comment applies also to all the methods recommended for staining, which give the result of a long and thorough experience in the various processes, and, speaking generally, we know of no better practical guide than is to be found here.

Then follow pages—very many pages—devoted to microchemical reactions, the theory of staining, and, as an appendix one-third as large as the book, on the chemistry of the coal-tar colours and similar matters, which space will not permit us to refer to at length. They will well merit careful study, but the question obtrudes itself as to whether the author has not gone a little too far afield, and whether it is really necessary to cover so many pages with chemical details already well known to experts and unintelligible to the ordinary reader without their context.

We regret that the author's modesty has not permitted him to add some account of *intra-vitam* staining and the examination of fresh tissues; we trust that in the future he may see his way to do so.

There are singularly few details to which exception can be taken, and small errors and misprints are conspicuously absent. The paper and general appearance of the book are, however, surely too meagre for the importance of the contents, and drawings of the author's preparations would be vastly more interesting than the illustrations of obsolete microtomes with which we are favoured. One page—460—must have been composed during a nightmare; we cannot imagine it represents the author's real views. It purports to treat of electrical measures. The *ampere* is defined as "a current which passes in every second at the rate of one coulomb through a conductor"! Ohm's law has a whole line to itself, and is thus printed:—"Ohm's law =

$$\text{current} \cdots \frac{\text{electromotive force}}{\text{resistance}} = \text{ampere} \frac{\text{volt}}{\text{ohm}} \text{"!!!}$$

It is very kind to tell us what a "macrocallory" is; we might otherwise have supposed it to be a kind of eel; in neither case is it a unit of electricity. Also——but we decently conceal the rest.

There is a very good index, and as a whole the book is one that is a most valuable contribution to our knowledge of physiological histology.

OUR BOOK SHELF.

The Figures, Facts, and Formulae of Photography. Edited by H. Snowden Ward. Pp. 166. (London: Dawbarn and Ward, Ltd., 1903.) Price 1*s.* net.

THERE is probably no other art that is so encumbered with formulæ as photography. Every maker of sensitive material seems to consider it his duty to supply his own particular formulæ for its use, and no doubt this has something to recommend it, but even conveniences may be multiplied until they result in confusion. Many formulæ for developers, for example, differ only in the methods of expressing them, except to an inappreciably small extent due to the use of different weights and measures. And when it is borne in mind that by far the greater number of formulæ are not based on a systematic trial of the effects of varying each of its constituents, as all ought to be, the value of even notable differences disappears.

But to eliminate useless formulæ is practically impossible, as it would introduce differences of opinion as well as of fact. We think, therefore, that the compiler of this volume has done quite right in including the "instructions" of the various manufacturers, and we should have preferred that he had gone even further than he has, and given the formulæ recommended by foreign as well as English houses. Of other formulæ for developers, we find those adopted by Messrs. Burroughs Wellcome and Co. for their "tabloid" preparations described as "standard" formulæ, though

why they should be so singled out is not stated. There is a considerable collection of development formulæ in addition to the above, but only one here and there has the name of its author attached. It would have been better if the author's name had been given in every case, with a reference to the source whence the formula was obtained. Various fixing solutions are given, neutral and acid, one including "acetone-sulphite," but alkaline fixing baths are not represented. Among "stain removers," too, weak alkaline solutions do not appear to be mentioned, though they are the best solvents of the coloured oxidation products of developing reagents.

In a few cases the compiler has ventured to state that one or the other formula is "the best," without quoting any authority or giving any reason for the preference. Among "hypo. eliminators," for example, "the best is plain water," but potassium percarbonate "is the best chemical destroyer of hypo." A soluble hypochlorite was the first "hypo. eliminator" suggested, now many years ago, and it remains unsurpassed, if equalled. It is, however, not mentioned here, and its omission is not due to the ease with which, if carelessly used, it attacks the silver image itself, because sodium hypochlorite is given as a stain remover.

Each of the thirty-three chapters is on a different subject, ranging from "The Studio" and "The Workroom," and the various operations that are generally understood as practical photography, to the "Facts of Copyright" and "Toilet and Hygiene." This last section treats of stained finger-nails; eyes affected by the coloured light of the dark room; skin irritation caused by developers, potassium bichromate, &c.; and similar subjects. The volume is full of information, and cannot fail to prove useful to the photographer who keeps it at hand.

U. S. Department of Agriculture. Field Operations of the Bureau of Soils, 1901. Third Report. Pp. 647+case containing thirty-one maps. (Washington: Government Printing Office, 1902.)

THE book under notice constitutes the third of the series of reports on the work of the Division of Soils, which is engaged in mapping the distribution and describing the agricultural characteristics of the various soil types met with in selected areas of the United States. The general scope of this remarkable undertaking has already been discussed in these columns when reviewing the Report of 1900 (NATURE, November 6, 1902); the present volume shows that the work of the Division has so far been appreciated by Congress that its progress has been assisted by increased appropriations, enabling it to enlarge its working staff and cover a greater area in its annual survey. The reports now presented deal with the most diversified types of land, and speak of the variety in the conditions under which farming is carried out in the United States. On the one hand, we read of intensive systems of agriculture, analogous to our own, as in New Jersey and Pennsylvania, old settled districts in touch with large centres of population, farming high, and either purchasing fertilisers or keeping stock to make manure; then we pass, as a contrast, to parts of Virginia and Georgia, which were ruined by the war and left without capital or energy, where it is still the custom to crop out the soil by continuously growing corn or wheat, and then clear a fresh farm, leaving the old land to fall back to scrub until it accumulates sufficient decayed vegetable matter to be worth breaking up again.

In the western States the contrasts are just as great between the arid regions, which are still "dry farmed," and can only produce a crop of barley or wheat every other season, the land being fallowed in the intervening years to gather two years' rainfall for the needs of one crop, and the rich irrigated land of California, famous for oranges, apricots, and other valuable fruits.

Two of the most interesting crops which come in for notice in this book are tobacco and sugar beet; in both cases the industry is being very rapidly developed in the United States; indeed, the production of beet sugar is an affair of the last two or three years only, and the expansion has been largely brought about by the energy and advice of the Division of Soils. Anyone seeking a striking example of the way a State can utilise scientific research for the fostering of a national industry cannot do better than study the work on tobacco of the United States Department of Agriculture.

Interesting as these volumes are to the agriculturist from the variety of the crops and the farming conditions described, they are equally valuable to many students of pure science; to the botanist they form a treatise on what might be called applied ecology, to the chemist and physicist the "alkali land" problems will appeal; the geographer will find illustrations, often accompanied by excellent photographs, of the most varied types of land surface and the changes to which they are subject; while the economist, as noted above, may obtain abundant material for his special study. An accompanying report sets the whole cost of the Division of Soils as a little under 8000*l.* for the year 1901; of this, the Soil Survey, exclusive of laboratory work, required a little less than half, 3·53 dollars per square mile for the 5596 square miles covered in the year, or almost exactly a farthing per acre, not an excessive charge on the capital value of the land! A. D. H.

Theoretical Organic Chemistry. By J. B. Cohen, Ph.D. Pp. xv + 578. (London: Macmillan and Co., Ltd., 1902.) Price 6*s.*

THE author commences his preface with an apology for bringing out a new book on organic chemistry. We are not, however, prepared to agree with Dr. Cohen that an apology is necessary. There are not very many good and complete text-books on organic chemistry in this country, therefore a new book—provided that it is good—would not be at all out of place. At another place in his preface the author says, "The production and uses of common materials, which come under our daily observation, are frequently relegated in some text-books of organic chemistry to a background of small print; in others entirely omitted." Dr. Cohen particularises such substances as lanoline, linseed oil, gelatine, the tannins, turpentine, &c. Our interest is at once aroused and we turn up turpentine, and this is what we find:

"Turpentine oil is used as a solvent in the preparation of varnishes, for mixing with pigments, as an embrocation, &c. It absorbs oxygen, when heated in presence of water, and the oxygenated water is employed as a disinfectant and deodoriser."

There is very little here about the production of turpentine. We then turn to linseed oil; here we are more fortunate, because there are seventeen lines devoted to telling us that the oil may be used for preparing linoleum, oil-cloth, and that it is employed in making varnishes and paints—but not a word as to its production. Again, the treatment of gelatine, tannin and lanoline can scarcely be called exhaustive. We are not at all sure that it is desirable in a text-book, the size of the one before us, to describe such substances in detail, but when the author lays claim to treat them more fully than they are treated in other text-books, one is rather surprised to find them dismissed with such scanty notices.

Of course, details of this kind do not condemn a book, and, in many respects, the book is very good.